

## CLAIMS

- 1           1.       A modular shade system comprising:  
2           a support structure defining a first area having a length and a width;  
3           modular panels, having upper and lower surfaces, mounted to and supported by the support  
4           structure, said modular panels covering at least about 80% of the first area, the upper surfaces of the  
5           modular panels being exposed surfaces;  
6           the modular panels comprising PV panels and supplemental panels; and  
7           the supplemental panels providing a feature other than shading and optionally providing shading.
- 1           2.       The system according to claim 1 wherein the support structure comprises:  
2           a series of generally parallel purlins;  
3           beams oriented transversely to said purlins, said purlins secured to and supported by the  
4           beams; and  
5           columns secured to and supporting said beams, whereby said purlins define the first  
6           shading area, the length and width measured parallel to and perpendicular to the purlins.
- 1           3.       The system according to claim 1 wherein the supplemental panels comprise light-  
2           transmissive panels and wherein light-transmissive panels cover about 0 to 50% of the first area.
- 1           4.       The system according to claim 1 wherein the supplemental panels comprise light-  
2           transmissive panels and wherein light-transmissive panels cover about 5 to 30% of the first area.
- 1           5.       The system according to claim 1 wherein the supplemental panels comprise light-  
2           transmissive panels and wherein the light-transmissive panels are placed adjacent to one another along a  
3           path parallel to the length.
- 1           6.       The shading system according to claim 1 wherein the PV panels are light-transmissive  
2           PV panels.

- 1           7.     The system according to claim 1 wherein the supplemental panels comprise light-  
2 transmissive panels and wherein the PV panels and light-transmissive panels cover at least about 90% of  
3 the first area.
- 1           8.     The system according to claim 1 further comprising protective panels mounted to the  
2 shading system subassembly opposite the lower surfaces of the PV modules.
- 1           9.     The system according to claim 8 wherein the protective panels comprise at least one of  
2 wire mesh, sheet metal, perforated sheet metal, plastic, perforated plastic, cement board, perforated  
3 cement board, and phosphorescent material.
- 1           10.    The system according to claim 8 wherein the PV modules and the protective panels are  
2 constructed to permit some light to pass therethrough.
- 1           11.    The system according to claim 8 wherein the protective panels have a convex lower  
2 surface.
- 1           12.    The system according to claim 8 wherein the protective panels are perforated.
- 1           13.    The system according to claim 8 wherein the PV modules cover at least about 90% of the  
2 first area.
- 1           14.    The system according to claim 1 wherein the supplemental panels comprise  
2 phosphorescent panels to provide passive nighttime illumination beneath support structure.
- 1           15.    The system according to claim 1 wherein the supplemental panels comprise planter  
2 panels for planting of plants.
- 1           16.    The system according to claim 1 wherein the supplemental panels comprise illuminated  
2 panels.

1           17.     The system according to claim 1 wherein the supplemental panels comprise water  
2 collection containers.

1           18.     The system according to claim 1 wherein the supplemental panels comprise space cooling  
2 elements comprising at least one of spray misters for evaporative cooling, fans, pumps, wetted canvas,  
3 water storage containers, tubing, and evaporative spouts.

1           19.     The system according to claim 1 further including modular features for multi-  
2 functionality and customization.

1           20.     The system according to claim 19 wherein said modular features include elements for  
2 space cooling comprising at least one of spray, fans, pumps, wetted canvas, water storage containers,  
3 tubing, and evaporative spouts.

1           21.     The system according to claim 19 wherein said modular features include elements for  
2 water collection and drainage.

1           22.     The system according to claim 19 wherein said modular features comprise acoustical  
2 control panels.

1           23.     The system according to claim 19 wherein said modular features comprise at least one of  
2 seating elements, planting elements, playground elements, restroom elements, signage elements,  
3 antennae modules, payment machines, and stage elements.

1           24.     The system according to claim 19 wherein said modular features comprise a rail  
2 transportation element.

1           25.     The system according to claim 19 wherein said modular features comprise a fuel cell  
2 charging system.

1           26.     The system according to claim 19 wherein said modular features comprise a hydrogen  
2 production device.

1           27.     The system according to claim 19 wherein said modular features comprise a hydrogen  
2 storage device.

1           28.     The system according to claim 19 wherein said modular features comprise inverters for  
2 converting dc to ac electricity.

1           29.     The system according to claim 19 wherein said modular features comprise electrical  
2 wireways.

1           30.     The system according to claim 19 wherein said modular features comprise elements  
2 which facilitate roller skating, ice skating, car shows, horse riding, housing the homeless, farmers  
3 markets, soccer matches, tennis matches, concerts, lightshows, fitness, transportation nodes.

1           31.     A photovoltaic assembly comprising:  
2 a mounting structure;  
3 a PV module, having upper and lower surfaces, supported by the mounting structure; and  
4 a protective panel mounted to at least one of the mounting structure and the PV module opposite  
5 the lower surface of the PV module.

1           32.     The system according to claim 31 wherein the protective panel comprises at least one of  
2 wire mesh, sheet metal, perforated sheet metal, plastic, perforated plastic, cement board, perforated  
3 cement board, and phosphorescent material.

1           33.     The system according to claim 31 wherein the PV module and the protective panel are  
2 constructed to permit some light to pass therethrough.

1           34.     The system according to claim 31 wherein the protective panel has a convex lower  
2 surface.

1           35.     The system according to claim 31 wherein the protective panel is perforated.